University of Oregon – Oregon Institute of Marine Biology / Charleston, OR

Larval settlement and post-settlement mortality as determinants of the spatial distribution of Olympia oysters in Coos Bay

Rose Rimler, Oregon Institute of Marine Biology

Project Title:

A collaborative approach to address reproduction, larval supplies, and settlement during recovery of native Olympia oysters

Location:

Coos Bay, Oregon

Goal:

Generate new science to support development of a conservation and recovery plan for Olympia oyster populations throughout Coos Bay

Partners:

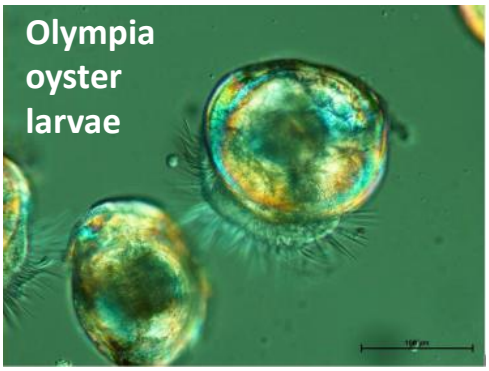
Oregon Institute of Marine Biology; South Slough National Estuarine Research Reserve; Oregon State University; Oregon Sea Grant; Oregon Department of Fish and Wildlife

Timeline:

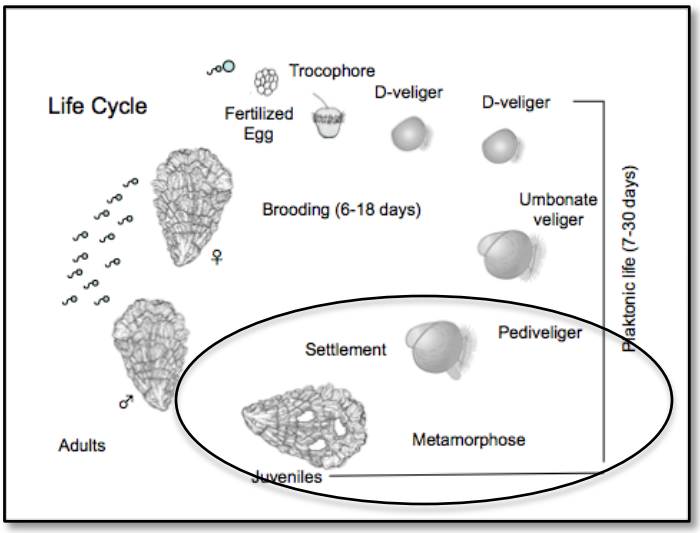
Nov 2011 to Sep 2013

What is "larval settlement" and "post-settlement"?

Olympia oysters (*Ostrea lurida*) have complex life-cycles that include conspicuous adults that live on the bottom and a microscopic larval phase that drifts in the water column. Female oysters brood their offspring for about 6-18 days, and then release swimming veliger larvae that resemble tiny clams. Planktonic larvae of Olympia oysters spend at least a week adrift in the tidal waters of Coos Bay. During the period of larval development the veligers swim and capture food with bands of beating cilia.



After they reach the pediveliger stage, the drifting larvae must find a suitable place to settle and attach to the bottom. Preferred settlement sites include hard surfaces such as other shells, rocks, gravel, or pilings. The tiny oysters are unable to re-locate during the post-settlement period. Consequently, selection of a suitable settlement site is important to ensure survival and growth to adulthood. These early events help determine the distribution of adult oysters in Coos Bay.



Where do larvae occur in the bay? Where are they most likely to settle?

To determine this, we will place ceramic settlement plates into the intertidal zone alongside larval traps at several locations within Coos Bay. The plates and traps will be monitored weekly throughout the summer and early fall to assess and compare larval supplies, settlement, and survival in different parts of the bay.

Newly Settled Olympia oysters attached to the underside of a ceramic plate

Photo: The Nature Conservancy

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Stakeholder Involvement:

Stakeholders participate as members of the Olympia Oyster Recovery Advisory Committee. Input and issues raised by the stakeholder committee are used to help direct and guide the scientific work completed by graduate students and faculty at the Oregon Institute of Marine Biology.

Support:

Financial support for the project is provided by a grant from the NOAA-NERRS Science Collaborative.

Learn More:

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Coos Bay is a drowned river-mouth estuary with a strong gradient in salinity

The lower part of the bay is marine-dominated, the middle is mesohaline, and the upper reaches of the bay, supplied by the Coos River, are riverine. Populations of Olympia oysters are distributed within the mesohaline and riverine regions of the bay. Oysters are most dense alongside the waterfront of downtown Coos Bay and North Bend, and near Eastside in Coos Bay. Little is known about their subtidal distribution; however, there is some evidence that subtidal populations are denser further inland (Baker 2000).

Do young oysters grow equally well in different parts of Coos Bay? What tidal height is best?

To determine this, we will place newly settled oysters at several sites throughout Coos Bay, and at three different tidal elevations in the mid, lower, and shallow subtidal zones. Juvenile oysters will be measured weekly from the fall through the winter to determine any differences in post-settlement growth and mortality.

Does larval nutrition affect juvenile growth?

It is possible that differences in the quality or quantity of food consumed by planktonic larvae may impact the rates of subsequent juvenile growth. To investigate this, we will raise larvae under different food rations, allow them to settle, then place the young settlers at one tidal height at the downtown Coos Bay site. The juveniles will be measured weekly from the fall through the winter.